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## Ammonia Problems in Wastewater Treatment Plants - Midnight Dumping

Your plant typically runs like clockwork, and you rarely have problems with nitrification. All of a sudden you are having weird spikes in ammonia and your nitrifiers are having problems or you wind up with other strange readings on your influent. What is going on?

We have seen this happen lately and were surprised at what we found out.

Clandestine methamphetamine laboratories have been a growing problem throughout Colorado and across the United States. In Colorado alone, the number of meth lab busts reported by the Colorado Bureau of Investigation has increased dramatically over the past few years. More than 12 million Americans are believed to have tried it, and 1.5 million are regular users. Nearly 10,000 clandestine labs that produce it were discovered in one year alone. High-quality meth that is cooked to 90 percent or higher purity can run \$5,500 a pound.

Methamphetamine or "meth" is a powerful, highly toxic, addictive drug that is illegally "cooked" in underground or hidden homemade labs. Meth is considered the most dangerous drug in the world. Meth labs have dramatically increased over the past several years because meth recipes are more readily available, it is relatively easy and cheap for anyone to make, and the resulting "high" lasts longer, about 2 to 14 hours versus only 15 minutes for someone with a cocaine high. A meth high produces an intense euphoric sensation called a "rush," described as an extremely pleasurable high of hyper-alertness, extreme energy, and confidence. Users become addicted quickly and use it with increasing frequency and in increasingly large doses. Meth simulates the body's natural pleasure chemical Dopamine. The body typically produces 150 units, vs. use of meth produces 1200 units, and at a very long sustainable length of time. This is extremely addictive to the body, but also highly damaging.

Meth labs may be set up at campgrounds, rest areas, rental homes, motel rooms, abandoned cars, garages, storage sheds, and vacant buildings. A typical meth lab looks like a collection of chemical bottles, glassware, hoses, and pressurized cylinders. The cylinders can take many forms, including modified propane tanks, fire extinguishers, scuba tanks and soda dispensers. The tanks usually contain anhydrous ammonia or hydrochloric acid – both highly poisonous and corrosive.

Meth lab equipment is frequently abandoned after use and the potentially explosive and very toxic chemicals and waste products are left behind. These materials are commonly abandoned alongside the road, in a convenient dumpster or left in a motel room, often in boxes or duffel bags. Abandoned chemicals may also be dumped on the ground in the woods or along roads, or may be dumped in a small pit and set on fire.

Consider this: for every pound of cooked meth produced, it is estimated that five to seven pounds of hazardous chemical waste are also produced. Cooking generates a long list of noxious solvents and gases, such as hydrogen chloride, phosphine, and meth itself. Much of the waste is dumped down the drain.

### What are some of the common meth lab chemicals and equipment?

Common chemicals and equipment found at meth labs include: Chemicals often used in meth production



include: iodine crystal, hydrogen chloride, acetone, lithium metal, drain cleaner, battery acid, antifreeze, red phosphorus, ether, lye, alcohol, and Freon®.

**Chemicals**

- Ephedrine or pseudoephedrine tablets
- Acetone, toluene, alcohol or paint thinner
- Iodine
- Red phosphorous (matches, fireworks)
- Anhydrous ammonia (in propane tanks or coolers)
- Camp stove fuel (naphtha)
- Starter fluid (ethyl ether)
- Lithium batteries
- Sulfuric acid, muriatic acid, phosphoric acid
- Sodium hydroxide (lye)
- Hydrogen peroxide
- Rock or table salt
- Toluene (break cleaner)
- Ether (Engine starter)
- Methanol (gas additives)
- Trichloroethane (gun scrubber)
- Kerosene
- Gasoline
- Muriatic acid (driveway cleaner)
- Paint Thinner

**Household Equipment**

- Glass containers (all cook ware such as Pyrex or Corning ware)
- Plastic or rubber tubing
- Funnels
- Propane tanks (with corroded, bent or tampered valves)
- Coffee filters (with red stains or ephedrine residues)
- Some type of power source or camp stoves or hot plates
- Rubber gloves
- Drain cleaner
- Empty cans of toluene, alcohol or paint thinner
- Starter fluid
- Iodized salt
- Hydrogen peroxide
- Empty pill bottles, boxes or blister packs
- Measuring cups, turkey baster,
- Hot plate, tape, strainer, aluminum foil,
- Blender or coffee grinder

The most common chemicals used to start the meth-making process are over-the-counter cold and asthma medications that contain ephedrine or pseudoephedrine as decongestants or stimulants. The two most common methods using these chemicals as primary ingredients are the Red Phosphorous and Birch methods. These chemicals are present in many common over-the-counter cold and asthma medications.

Some of the warning signs of a suspected meth lab include:

<b>Strong or unusual odors (solvents, ammonia, ether-like, vinegar-like, pungent, acrid or sour)</b>	<b>Residences with windows blacked out</b>
<b>Discoloration of structures, pavement and soil</b>	<b>Renters who pay landlords in cash</b>
<b>Increased activity, especially at night</b>	<b>Excessive trash</b>
<b>Unusual security systems or other devices</b>	<b>Unusual structures</b>

Meth labs are considered hazardous waste sites and should only be entered by trained and properly equipped professionals (i.e., first responder Hazardous Material (hazmat) Teams). Never handle materials you suspect were used for making meth, such as contaminated glassware or needles. Skin contact can result in burns or poisoning. Handling items can also cause some of the chemicals to ignite or explode on contact with water or air.



DO NOT ENTER a site that you think may be used for cooking meth. Immediately call your local police department. Meth labs present extreme dangers from fire, explosions and exposure to hazardous chemicals. Breathing chemical fumes or handling unknown substances can cause injury and even death.

### **What are the typical chemicals that may wind up in the sewer and down to your wastewater plant?**

The most common types of contaminants expected to be discharged in septic systems associated with meth labs are: solvents (e.g., toluene, xylene, alcohol, acetone); petroleum distillates (e.g., paint thinner, camp stove fuel); liquid corrosives (e.g. sulfuric acid, muriatic acid, sodium hydroxide solutions), and mixtures with residual ephedrine, methamphetamine, iodine or red phosphorous.

Cyanide is a byproduct of meth production and can significantly impact a wastewater plant if in high enough concentrations. Some other chemicals that might wind up in the drains include Iodine compounds, Chlorpseudoephedrine, Phosphine gas (produced from overheating), Yellow or white phosphorous, Various used acids (hydriodic and phosphoric acid gas), Meth residues and Residual unused chemicals.

VOC's from meth labs have been known to reach over 10,000 ppm!

One material believed to cause wastewater problems -- toluene -- can be used in the production of methamphetamine. But it's also used in materials found in a variety of other places, including auto body shops and beauty salons. The three chemicals having the biggest impact on the environment are acetone, ether, and white gasoline

### **What are the signs you have a meth lab in your community-**

Weird spikes in loading, sudden upset conditions in your plant, brown effluent, loss of nitrification, influent high TOC, high amine levels.

The problem can be exacerbated by the fact that these dumps typically occur at night, when wastewater flows are minimal and there is less water to dilute the problem chemicals.

### **What should you do about it?**

If you suspect dumping, the authorities must be involved. Tracking upstream in the lift stations for point source narrowing down may be a way to come close geographically to the source. Then leave it up to the Federal Authority and police.

Next thing is to focus on the health of your wastewater treatment plant.

If just minor chemicals have been spilled that are impacting your plant such as ammonia and amines, make sure to check alkalinity in your plant. Sometimes just increasing that will help your plant handle the extra loading. pH adjustment may be needed if you have caustics or acids dumped down.

Sometimes bioaugmentation can help if your plant is impacted to help with upset recovery or to just handle the additional loading. Give us a call and we can help with the bioaugmentation products or solutions.